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# **DNA Evidence? The impact of genetic research on historical debates**

**Yulia Egorova (Durham University), [yulia.egorova@durham.ac.uk](mailto:yulia.egorova@durham.ac.uk)**

## **Abstract**

The paper explores how the relationship between genetics and history is performed in genetics studies that aim to reconstruct human migrations. It focuses on two case studies: research on the nature of genetic diversity of South Asian populations and on the genetic history of different Jewish communities. Analysis is based on a close reading of sixteen articles on the genetic history of Jewish and South Asian populations and on in-depth interviews with eight geneticists who played a key role in either or both types of studies and with twenty historians with expertise in the issues examined in the genetic studies under survey. The paper discusses the way geneticists construct their contribution to historical debates and the way this contribution is perceived by historians. It will be demonstrated that geneticists and historians are keen on demarcating their disciplines from each other with geneticists insisting on keeping some distance from historical evidence for the sake of maintaining ‘objectivity’, and historians questioning the epistemological validity of genetic interventions into their field. It will be argued that what accounts for this lack of engagement with each other’s discipline are the socio-cultural norms associated with academic practice in the natural sciences and humanities and a tendency towards monodisciplinary peer-review.

Key words: population genetics, history, interdisciplinarity, expertise, Jewish communities, India.

Luigi Luca Cavalli-Sforza, one of the founding fathers of population genetics, asserts on the cover text of his book *Genes, Peoples and Languages* (2000):

Historians relying on written records can tell us nothing about the 99.9 per cent of human evolution which preceded the invention of writing. It is the study of genetic variation, backed up by language and archaeology, which provides concrete evidence about the spread of cultural innovation, the movements of peoples ... the precise links between races’.

Geneticists Mary-Claire King and Arno Motulsky explain that ‘the DNA of modern humans contains a record of the travels and encounters of our ancestors’ and that ‘[b]y sampling genotypes from people across the globe, geneticists have reconstructed the major features of our history: our ancient African origin, migrations out of Africa, movements and settlements throughout Eurasia and Oceania, and peopling of the Americas’ (King and Motulsky 2002, 2342).

The assumption that ‘DNA evidence’ may help in historical research appears to have informed a whole new field in population genetics, which is sometimes described as genetic anthropology or genetic history. Such studies aim to reconstruct the history of human migrations and cast light on the origins of various populations. Their research questions often come directly from historical debates. At the same time, they are normally performed solely by geneticists and their results are presented in a ‘technical’ language which would hardly be accessible for historians, and are disseminated in mainstream scientific journals aimed at geneticists and other natural scientists. This raises questions about the intended audience of these types of genetic interventions and about their actual impact on the historical research to which they claim to be making a contribution.

This paper explores the way DNA studies of human migrations enact the relationship between genetics and history by focusing on two case studies: research on the nature of genetic diversity of South Asian populations and on the genetic history of different Jewish communities around the world. The potential socio-political implications of this research and the way it was received in the mass media and by the general public have been explored elsewhere (Parfitt and Egorova 2006, Egorova 2009a, Egorova 2009b). Here I would like to focus on studies in population genetics as a site of the encounter between genetics and history. The objectives of the paper cluster around two sets of research questions. First, the paper will discuss the way geneticists construct their contribution to historical debates. How do they present the aims of their research in peer-reviewed publications? To what extent do they view their work as ‘genetic’, ‘historical’ or ‘interdisciplinary’? Who do they consider to be their main audience? Do they collaborate with historians? Secondly, the paper will examine the way this research is perceived by historians working on the problems that geneticists attempt to cast light on. Do they find this research useful and would they reference it in their publications? Would they change their position in a historical debate in light of ‘genetic evidence’? Are they open to the idea of collaborating with geneticists?

Pierre Bourdieu has suggested that ‘contacts between sciences, like contacts between civilizations, are occasions when implicit dispositions have to be made explicit’ (Bourdieu 2004, 42). The selected case studies provide an opportunity to examine to what extent

geneticists and historians are open to interventions from each other's disciplines, whether they draw any boundaries between their fields, how they define their areas of expertise, and whether they consider each other to be legitimate commentators on the issues they are studying.

In this respect, the paper will contribute to academic discussions about the nature of interdisciplinarity, which is often defined as 'the integration of existing disciplinary perspectives' (Lattuca, Voigt, Fath 2004: 24). Some commentators have welcomed scholarly efforts aimed at transcending disciplinary boundaries. For instance, Mary Midgley has described the existing division of disciplines into sciences and humanities as rather artificial (2001). The lack of knowledge of 'what is going on' in other disciplines has been critiqued by a number of scholars (e.g. Bauer 1990, Becher and Trowler 2001, Clark 1963, Moran 2002). The particularly wide 'cultural gap' between humanities and sciences has been lamented by C.P. Snow in his famous essay 'The Two Cultures' (1979). Steve Fuller opined that only interdisciplinarity promises to bring 'sustained epistemic change' (quoted in Barry et al 2008, 26). It has been also observed that recently interdisciplinarity has turned into a subject of inquiry not just by academics, but also by governments and funding agencies, and has come to be seen as a solution to a number of contemporary problems, such as, for instance, the relationship between science and society (Barry et al 2008). Helga Nowotny, Peter Scott and Michael Gibbons have suggested that this concern with interdisciplinarity can be seen as part of a shift from what they describe as Mode-1 science to Mode-2 knowledge production, which is supposed to involve research transcending disciplinary boundaries (2001).

These accounts of interdisciplinarity have been interrogated by Andrew Barry, Georgina Born and Gisa Wenzel, who on the basis of their empirical study of three interdisciplinary fields have distinguished between three modes of interdisciplinarity – the integrative-synthesis mode, the subordination – service mode, and the agonistic – antagonistic mode. The first one is supposed to be achieved through the synthesis of different disciplinary approaches. In the second mode, one or more disciplines are arranged in a relation of service to other disciplines and presuppose a hierarchical division of scholarly labour. In the third mode, interdisciplinarity stems from opposition to the given assumptions of existing disciplines (2008, 28-29). The authors also stress the importance of distinguishing between different types of cross-disciplinary research – interdisciplinarity, multidisciplinary and transdisciplinary. Unlike interdisciplinarity, multidisciplinary is often described as a type of knowledge production involving collaborative effort from different disciplines, which remain unchanged in the process. Ian Hacking has made a case for multidisciplinary when he stated that disciplines collaborating in the study of complex objects should retain their

disciplinary base. Transdisciplinarity, on the contrary, is supposed to involve a transcendence of disciplinary boundaries, and is a term chosen by Nowotny et al. for the Mode-2 knowledge production (2008, 27).

Studies in ‘genetic history’ considered here cast a new light on these important accounts of disciplinary boundaries. On the one hand, they fit the description of interdisciplinary research, as they are supposed to integrate genetics and history to a considerable degree. For the purposes of fund-raising and popularization of these studies in the mass media, they are ‘advertised’ as genetics meeting history. Indeed, the aim of these studies is to answer historical questions, which for geneticists would involve a high level of engagement with the discipline of history. However, a close examination of scientific papers published on the basis of these studies and interviews with geneticists and historians reveals that more often than not this research is mainly conceived as a monodisciplinary effort by geneticists and is dismissed as alien to the discipline of history by historians.

This paper will demonstrate that though geneticists and historians are familiar with research emerging in the other discipline and are open to the idea of engaging with it to some degree, they are also keen on demarcating their disciplines from each other. This makes the relationship between geneticists and historians also interesting from the perspective of studies on boundary-work in science. Thomas Gieryn (1999) has examined the way scientists attempt to draw boundaries between disciplines or to demarcate science from non-science in order to re-claim contested epistemic authority. Olga Amsterdamska has observed that oftentimes studies in boundary work have focused on demarcations in conflict, while ‘scientists might also sometimes attempt to demarcate their fields under circumstances when no actual “enemy” or competitor is in sight and for purposes other than “expansion”, “expulsion” and “protection of autonomy” (2005: 20). This paper will explore whether historians and geneticists construct the relationship between them as competitive or complementary. It will be suggested that while geneticists see it as the latter, historians tend to perceive it as the former. For geneticists their relationship with history does not involve conflict or contestation of power. They see it as a way of filling in gaps in historical knowledge by using more ‘objective’ and therefore reliable methods than those traditionally available to historians. However, geneticists argue that to be able to make this ‘more objective’ contribution to history, they need to dissociate themselves from historical research and to make sure the validity of their work is recognised first and foremost by colleagues from their ‘home’ discipline.

At the same time, historians appear to see genetic studies as an unwelcome attempt to colonise their discipline. Symptomatic of this concern are their statements about natural

sciences being perceived both by the public and the funders as having more cognitive authority. The paper will argue that in responding to genetic research historians renegotiate the boundaries between ‘science’ and ‘pseudoscience’, and between ‘good’ and ‘bad’ scientific practice. These boundaries, which are often used rhetorically in scientific discourse to demarcate practices vested with cognitive authority from research of inferior epistemological significance, are reinterpreted by historians trying to reclaim their field of expertise. Boundaries between ‘good’ and ‘bad’ scientific research are redefined by them not just on the basis of the perceived cognitive value of these studies but also in relation to their social and political implications. In this respect it will be suggested that historians distinguish between what I will term Science with a capital ‘S’ and science with a small ‘s’. They appreciate that the genetic studies in question may be considered *bona fide* science by other geneticists, however, they still see them as an overall failure, because they do not succeed in answering the set historical questions to the satisfaction of historians.

The case studies considered here also provide an intriguing new perspective on the three modes of interdisciplinarity suggested by Barry et al (2008). As in mode 2, both historians and geneticists see their relationship as hierarchical. Both groups appear to view genetics as a discipline which is in a service position in relation to history. However, ironically, geneticists nevertheless consider their discipline to be cognitively superior to the one from which they are deriving their research questions. At the same time, historians see this relationship also as antagonistic (mode 3), as their attitude towards genetics is mainly characterized by a desire to challenge its epistemological assumptions. This divide is reinforced by a lack of accountability that geneticists demonstrate vis-à-vis historians. Despite the fact that geneticists are supposed to be contributing to historical questions, they do not appear to be under any pressure either to publish in historical journals or to be peer-reviewed by historians. As a result, their findings, which appear in high-profile journals of the natural sciences, are discarded as flawed and meaningless by the very scholars whose work they are supposed to augment.

This paradoxical situation may be symptomatic of some of the more general problems which prevent interdisciplinarity from emerging as a new form of knowledge production ‘on the ground’, rather than just in media headlines, grant applications and policy documents. These problems include the perceived hierarchy of disciplines, unequal distribution of funding, and lack of accountability to researchers from other disciplines, effected by the peer-review system.

My analysis is based on a close reading of sixteen papers on the genetic history of Jewish and South Asian populations, and in-depth interviews conducted with eight geneticists

who played a key role in either or both types of studies and with twenty historians with expertise in the issues examined in the genetic studies under survey. Interviews were conducted in India, Russia, the UK, and the USA.

### **History without history: accounts of geneticists**

Genetic studies on South Asian populations which engage with historical topics often attempt to cast light on the origin of the caste system and on the nature of genetic diversity on the subcontinent. Some of them explicitly address the debate about Aryan migration. According to a historical narrative dating back to the British period, the caste system was established as a result of so-called Aryans, who originated in Eurasia and descended on the subcontinent in the second millennium BCE, forming the upper strata of society, while pushing the 'indigenous' groups into subservient positions. The 'Aryans' were supposed to be of the same stock as those groups who went west to Europe. Allegedly the Aryans brought to the subcontinent an Indo-European language that later developed into Sanskrit. This account started losing its popularity around the middle of the twentieth century due to a lack of adequate archeological evidence (Sharma 1999; Thapar 2002; Trautmann 1997). The idea that Indian castes may be representing groups of different 'racial' or 'ethnic' origin and that members of upper and lower castes may differ in terms of their physicality rather than only in respect to their occupation and culture has proved to be extremely controversial. In British India debates about the relationship between caste and 'race' appeared in the discussions of colonial scholars-administrators and of Indian nationalists. In independent India these debates, as well as the theory of Aryan migration, featured prominently in the discourses of the Hindu right and activists of the Dalit (untouchable) movement. When the Hindu nationalist Bharatiya Janata Party (BJP) was in power from 1998 to 2004, its leaders attempted to revise Indian history textbooks to argue that 'Aryans' originated on the subcontinent, construed as the cradle of both Indian and European civilizations (Roy et al 2005). Some Dalit ideologues, on the contrary, have sought to argue that Indian upper castes are the descendants of Aryans who came from outside of the subcontinent and therefore should be considered as 'newcomers' and 'conquerors' in respect of the autochthonous populations which formed the lower castes and untouchable groups. It has also been suggested by them that caste discrimination could be equated with racism (Prashad 2000, Reddy 2005).

The past decade has witnessed a growth in the number of DNA studies that aim to explore the genetic relationship between the different castes and tribes of India. Some of them

explicitly and others implicitly attempt to contribute to the debate about Aryan migration. As was shown elsewhere (Egorova 2009b), so far these studies have not reached a consensus about the nature of genetic diversity of the subcontinent. Some of them have argued that upper castes demonstrate more significant genetic proximity to ‘Europeans’, which may date back to the period of the alleged Aryan migration (Bamshad 2001, Cordeaux 2004). Others arrived at the conclusion that the genetic diversity of the South Asian population predates the possible Aryan migration and does not map easily, if at all, on caste groups (Kivisild 2003, Basu 2005, Sahoo 2006).

Just like DNA research conducted in South Asia aimed to address the ‘big mysteries’ of early Indian history, genetic studies of Jewish populations attempted to cast light on some of the puzzles of Jewish history, which have both occupied the attention of professional historians and were of importance in public imagination. These studies claimed to test the idea about contemporary Jewish communities being descended from one source in the Middle East, as well as other Biblical, rabbinic, and popular traditions pertaining to Jewish history. The research that was publicised most widely has included studies on the Cohens and the Levites, on the ‘Jewish mothers’, and on the Lemba Judaising movement of South Africa. The first two sets of studies attempted to test the tradition, according to which the status of Jewish priests and Levites had been for centuries transmitted from father to son (Thomas et al 1998, Behar et al 2003). The study on the ‘founding mothers’ of different Jewish communities tried to determine whether the maternal transmission of the status of the Jew would be reflected in the DNA of Jewish populations (Thomas et al 2002, Behar et al. 2004, Behar et al. 2006). The study on the Lemba explored the possible Jewish origin of this Bantu-speaking community of southern Africa (Thomas et al 2002).

This section will examine the way the relationship between genetics and history is constructed in scientific papers presenting the results of genetic studies on South Asian and Jewish populations and how it is conceptualised by scientists interviewed by the author. The overwhelming majority of papers were published in major peer-reviewed scientific journals, such as *Nature*, *American Journal of Human Genetics*, *European Journal of Human Genetics*, *PNAS*, and *Current Biology*. As one of the interviewed geneticists explained to me, this choice of journals was determined by the fact that the number of population geneticists working on the history of human migrations was not large enough to establish a separate journal. Publishing in journals of history was deemed to be even more problematic, as such publications would neither count as eligible in various assessments of research outputs, nor would they be read and acknowledged by his colleagues – natural scientists. When asked whether they normally try to disseminate the results of their research among historians or



would consider publishing in journals of history, all respondents noted that they were under too much pressure to publish in ‘proper’ journals of their discipline to be able to invest enough time in publishing outside of the narrow circle of high impact scientific periodicals.

In this respect it is interesting to consider the way geneticists present the objectives and research questions of their studies. Do they engage with historical sources in their publications? Do they stress the relevance of their work to historical debates or do they prefer to downplay it and emphasize the significance of their results for genetics?

Practically all papers contain only a minimal number of references to historical, social anthropological, archeological, or linguistic studies. Only very few of them have historians as co-authors (Thomas et al 1998, Thomas et al 2000). At the same time, most of them aim to shed light on a historical question. The titles of most of them indicate which historical issues they are dealing with and what argument they are going to develop.

Most papers begin with a reference to a specific historical question and make a bold statement about how the analysed genetic data may help to shed light on this question. For example, this is the opening paragraph from one of the papers on the genetic profile of Jewish priests:

According to Jewish tradition, following the Exodus from Egypt, males of the tribe of Levi, of which Moses was a member, were assigned special religious responsibilities, and male descendants of Aaron, his brother, were selected to serve as Priests (Cohanim). To the extent that particular inheritance has been followed since sometime around the Temple period (roughly 3,000 - 2,000 years before present), Y chromosomes of present-day Cohanim and Levites should not only be distinguishable from those of other Jews, but – given the dispersion of the priesthood following the Temple’s destruction – they should derive from a common ancestral type no more recently than the Temple period. Here we show that although Levite chromosomes are diverse, Cohen chromosomes are homogenous. We trace the origin of Cohen chromosomes to about 3,000 years before present, early during the Temple period (Thomas et al 1998, 138).

Similarly, Bamshad et al’s paper on the origin of Indian caste populations begins with a very clear outline of the historical debate that it attempts to contribute to.

Shared Indo-European languages (i.e. Hindi and most European languages) suggested to linguists of the nineteenth and twentieth centuries that contemporary Hindu Indians are descendants of primarily West Eurasians who migrated from Europe, the Near East, Anatolia and the Caucasus 3000-8000 years ago... These nomadic migrants have consolidated their power by admixing with native Dravidic-speaking (e.g. Telugu) proto-Asian populations who controlled regional access to land, labour and resources... and subsequently established the caste hierarchy to legitimate and maintain this power... It is plausible that these West Eurasian immigrants also appointed themselves to predominantly castes of higher rank. However, archeological evidence of the diffusion of material culture from West Eurasia into India has been limited... Therefore, information on the genetic relationships of Indians to Europeans and Asians could contribute substantially to understanding the origins of Indian populations (Bamshad et al 2001, 994-995).

Thus in Barry et al's terms, the authors firmly position genetics as a service discipline in respect to history. DNA tools are here for historians to help them do their job. Some papers make specific suggestions about how historians could take their research further by using genetic data. For instance, Behar et al's paper (2003) on the origins of Ashkenazi Levites demonstrates that this population has a distinctive haplogroup R1a1 at high frequency, which is very common in populations of Eastern European origin, and a common ancestor within the past 2,000 years. It is implied in the paper that what may have led to a high frequency of R1a1 within the Ashkenazi Levites was that this group had a founder (or a limited number of founders) of non-Jewish European origin, whose descendants assumed Levite status. The paper goes on to speculate about the possible historical context of these events and suggests that '[o]ne attractive source would be the Khazarian kingdom, whose ruling class is thought to have converted to Judaism in the 8th or 9th century' (Behar et al. 2003, 777). Thus, the 'objective' scientific results about the presence of R1a1 modal haplogroup among the Ashkenazi Levite Jews are further interpreted in the direction of an intriguing and historically relevant suggestion about a possible conversion event preceding the formation of the Ashkenazi community. The paper concludes by saying that the study 'has revealed evidence for an unexpected and unusual historical event, which was not appreciated using other, more conventional historical approaches'. It even asserts that the presented findings 'may motivate historians and social scientists to seek further information regarding the possibility of such an event, and, more generally, to include information gleaned from

studies of DNA variation in the repertoire of tools used to uncover historical events ...' (Behar et al 2003, 778).

Just like the papers explicitly state their objective of intervening in historical debates, in the interviews almost all respondents observed that they deliberately chose to explore historical questions by using DNA analysis. At the same time, just like the papers failed to demonstrate adequate engagement with historical literature, interviewed geneticists expressed only a very limited degree of interest in actively collaborating with historians in the process of their everyday research. Moreover, all of them explicitly or implicitly tried to dissociate their work from historical research at least to some extent. Despite the fact that in the papers research questions are formulated in such a way that genetics seems to be just a tool summoned to serve history, in the interviews geneticists portray history as a cognitively inferior discipline by presenting it as an infantile activity. I asked each interviewee to define their disciplinary affiliation. Every one of them stressed that they were first and foremost geneticists and happened to be doing this kind of research by chance. When I asked one respondent how he became interested in applying genetics to history he laughed and said, 'I used to have a respectable career'. He went on to explain that he was trained as a geneticist and was initially involved in medical research, but then an opportunity came up to work on human history. As he had always had a genuine interest in history he was glad to take it up. His ironic remark constructs a juxtaposition between his current research on genetics and history and earlier work which career-wise was more 'respectable'. This assessment of his career path most probably reflects the views of the wider scientific community on these types of studies.

Several respondents spoke about history as their childhood hobby. These remarks again contribute to the narrative about history being somewhat 'easier' than genetics, a job that even a child can do. This is how one of the geneticists described his research interests:

So, I'm not a trained historian of pre-history or historical times. But it's been a theme that's always been one of my interests, a hobby interest. So I was fortunate that I could merge my professional training in biology and molecular biology and then look at history from a DNA perspective. And that sort of helped me satisfy... helped me get more involved in one of my earlier interests as a child, history'.

One of my respondents admitted that he and his colleagues in this field were often under pressure to overemphasize their potential contribution to historical debates when applying for funding, and to over-interpret their results when preparing papers for publication.

He noted that it was hard enough to obtain funding for these types of studies - studies which dealt with history, rather than, for instance, with medicine - not to try to sensationalise them at least to some degree. This response demonstrates that scientists feel that they are under pressure to achieve interdisciplinarity 'on the paper'. The deeper their research proposals engage with historical debates, the more likely their projects are to attract financial support. This is not surprising given the interest that governments and funding bodies currently express in interdisciplinary research – a phenomenon described by STS scholars and mentioned in the introduction. However, once funding has been obtained, geneticists feel the need to shed the 'spoilt identity' of humanities scholars (Goffman 1963) by minimizing their involvement with academic history. Ironically, they defend their position by claiming that the deeper they engage with history, the less 'objective' (and therefore 'correct') their findings will be.

One informant stressed that interpreting genetic data was always a challenge, particularly if they had to be considered in light of specific historical debates. He suggested that even the most up-to-date techniques developed in population genetics could not give researchers enough 'molecular resolution' to offer anything like a definitive answer to such complex questions as those about the dispersal of the Jewish people or about the formation of the caste system. Ironically, in his view, one way of avoiding over-interpretation was not getting involved in historical and archeological scholarship on the studied subject. The interviewee argued that paying too much attention to historical and archeological evidence could lead to the possibility of bias:

What I like out of a historian ... you know ... they're certainly welcome... but what I'm looking for ... is ideally two competing models ... And one model suggests this and one model suggests that... And I go in there with neutrality for either model because I'm ignorant to what... I don't have any vested interest of which model is right from an archaeological perspective. But that provides a framework for a potential genetic investigation if one can get the appropriate samples etc etc... Then you can... then you have a framework to do very traditional... you know here's the data and let's analyse the results and let's compare the results, are they more consistent with model A or model B. And then you write your discussion and you say well my results are consistent with neither model. Or I have a hybrid model or my results are very consistent with A and not consistent with B. And you don't get too bogged down about why B's wrong or A is right from an archaeological perspective because you're writing for a genetics journals and it's going to be read by geneticists primarily, not necessarily archaeologists. But then you know you've contributed a little piece of evidence and the

archaeologists are going to eventually fight over what your genetic data means ... You're hoping that you're contributing a small piece of a puzzle ... And it's not necessarily going to be a tipping point. But you've added to a course correction towards the truth.

Historical and archeological research here is construed as 'biased' and 'subjective'. Therefore, paradoxically, the geneticist's argument is that to be able to provide 'objective' data that will help historians in solving their controversies, scientists should not be engaging too deeply with historical and archeological research.

At the same time, most interviewees admitted that though they would hardly be able to invest much time and energy in it, they would benefit from some form of collaboration with historians if it was initiated by historians or organised by a third party and was not too time-consuming. As one of them put it, 'I would not mind attending a workshop or two with historians. Why don't you arrange something like this?' Two of them were ready to make significant effort to engage with historical research. One interviewee stressed that it was imperative for geneticists to disseminate the results of their research among historians and for this reason he would sometimes attend conferences organised by historians and other social scientists and humanities scholars. At the same time, he admitted that his career depended entirely upon his track record of publications in scientific journals and the opinion that his geneticist colleagues, rather than historians, had about his work.

One interviewee was actively collaborating with historians already. Together with colleagues from a History department he was applying to an external funding body for a grant which would sponsor a PhD studentship. The student would be working on a project concerning genetic history and ideally would have an undergraduate degree in History and would later receive training in genetics. Reflecting on his experience working with historians, my respondent observed that lack of expertise in each other's fields was a considerable stumbling block for him and his collaborators. He also pointed to other structural problems in the relationship between geneticists and historians, such as the lack of an adequate peer review process of genetic papers on human migration. He suggested it would be useful to send papers by population geneticists not just to their peers but also to relevant historians for review. I pointed to him a paper where in the view of the historians whom I interviewed the lack of proper engagement with up-to-date historical research rendered the results of the genetic study invalid. My respondent admitted that this was an example of a flaw in the review process, and due to a lack of multi-disciplinary refereeing it was all too easy for geneticists to get away with poor engagement with history, even if it significantly affected the

outcomes of their work. Even this interviewee kept stressing that it was hard to obtain funding for these types of studies and that, like some of his other colleagues, he had to do other work which had nothing to do with human history.

Almost every interviewee raised the question about the potential social and ethical implications of their research. They all seemed to be fully aware of the possible impact of their research on the self-identification of the studied communities. In this context one of the respondents observed that sometimes he wished he was studying animals, as he did not want to deal with the possible social consequences of his work. All respondents were very well aware of the tragic history of Nazi science and eugenics and in the interviews did their best to dissociate their research rhetorically from this history. However, they also insisted that they could not control the way their research was going to be interpreted by the ‘general public’ and claimed that they could not be held accountable for the possible consequences of their work. To use Anne Kerr et al’s terms, my respondents tended to relegate the ethical implications of their studies to the ‘macrorealm’ of the wider social context of scientific research which had nothing to do with ‘pure’ science (1997).

Duana Fullwiley has observed on the basis of her study of the way American geneticists use the concept of race in their work, that as much as scientists try to dissociate themselves from racist thinking, they use racial categories as a practical and conceptual tool without interrogating critically their function (2007). Similarly, in the examples presented here, geneticists fail to acknowledge that their research unnecessarily biologises the caste system and definitions of Jewishness.<sup>1</sup> One respondent, who was involved in studies on Jewish populations, mentioned that his research was likely to be misinterpreted and misused by some, but insisted that it was out of his hands. He said that people used to approach him and ask whether it could be ‘genetically’ tested if they were Jewish. He was adamant to stress that being Jewish was not about genetics and it was wrong that this research was interpreted this way, but claimed that he had no control over these types of ‘popular’ representations of his work. Another respondent, who was engaged in research in India, suggested that the caste system is far too complex to reduce it to genetics. As will be demonstrated below, this position, which disentangles caste and Jewishness from physicality ‘in real life’, is very similar to that of the historians. However, in their scientific work geneticists still link these categories to biology without interrogating the rationale for this practice.

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<sup>1</sup> For a wider discussion on biologisation and molecularisation of race see Duster 2005, Fullwiley 2008.

## Science with a small “s”: historians’ responses to genetics

It has been demonstrated by social scientists that the usage of ‘DNA evidence’ beyond the realm of academia has hardly proved to be uncontroversial. For instance, Amade M’charek has shown in the context of her study of a Forensic DNA laboratory that a genetic marker is much more of an invested category, rather than a universal tool (2005). Michael Lynch and colleagues (2008) have argued on the basis of their ethnography of ‘DNA fingerprinting’ that the value of DNA evidence in the courtroom very much rests on practices and circumstantial knowledge, which are not radically different from those that support more conventional forms of evidence.

This section will explore to what degree historians accept ‘genetic carbon dating’ as a valid historical method and whether they see DNA techniques as a more effective and ‘objective’ tool that they could use instead of or alongside historical methods. To examine the impact that population genetics may have had on the discipline of history I have interviewed twenty historians working in the fields of South Asian and Jewish Studies. Most of them were senior scholars who have made a significant contribution to their discipline. In addition, I have also had numerous informal discussions on the issue with my colleagues from the fields of Jewish Studies and the history and social studies of South Asia. The respondents were asked whether they were aware of any genetic studies conducted in their field of inquiry, and if yes, if they could assess their significance for historical research.<sup>2</sup>

Unlike the jurors in the courtroom, historians hardly felt they were under any pressure to consider ‘DNA evidence’ in their work. All the respondents working in the field of Jewish Studies said that they were familiar with the study on the ‘common’ origin of the Jewish communities worldwide, on the Cohen Modal Haplotype and on the Lemba, as they had been widely publicised in the mass media. All historians of caste were aware of some genetic research on Indian populations.

Almost every interviewee observed that they could not understand genetic research completely and that generally historians and social scientists could hardly be expected to know enough genetics to be able to ‘check upon’ these studies unless the entire system of academic education was restructured. Most of them observed that geneticists themselves disagreed with each other and it was impossible for a historian to determine whose findings were ‘correct’. One person said that it was a classic example of C.P. Snow’s ‘two cultures divide’ (Snow 1979). Another respondent, who was happy to refer to genetic research on the

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<sup>2</sup> Some parts of this section have been published in Egorova 2009b.

Kohanim in his Jewish history class, stated that he had to read the relevant article every year before the class, where he mentioned it, because it would not ‘sink in’ for him.

However, at the same time, my respondents were all able to make constructive criticisms about the way geneticists formulated their questions, and selected their target populations. One historian, commenting on a paper on the origin of Indian castes, argued that he was happy to believe it was probably ‘scientifically correct within the discipline of genetics’, but on the whole it was a failure because the researchers were not up to date with current historical research on caste, did not define their categories properly and got their sampling wrong. As one historian observed, ‘they may think that they got their science right but at the end of the day it is bad science because their poor knowledge of history rendered their results useless’. It is interesting how he distinguishes the science that geneticists have ‘got right’ from the science that they ‘got wrong’. This feeling was shared by most of the interviewed scholars. In discussing genetic studies on human history they were creating a dichotomy between what I would refer to as science with a small ‘s’ and science with a capital ‘S’. Science with a small ‘s’ that in the view of my respondents the geneticists ‘got right’ is laboratory science, statistics, benchwork, but science with a capital ‘S’ that they ‘got wrong’ is this grander investigatory process which was supposed to cast light on the origin of caste. It is in this process that, according to the interviewed, the geneticists were a failure, as their research methodology did not allow them to answer the set research question in a meaningful way. To use Barry et al’s typology, they clearly saw genetics as a service discipline in relation to history, but considered the service provided by it of very little use to their research.

About two thirds of my respondents felt very strongly that geneticists should not interfere in historical debates at all because they were bound to be asking wrong questions and unnecessarily naturalizing social categories. Some historians of South Asia noted that the question about the ethnic composition of different castes was of no historical significance. On the whole they could not see historians using it as yet another methodological tool for their research in the foreseeable future. One of them attempted to dissociate both himself and his discipline completely from genetics:

I don’t think that genetic research is going to be of any help to me in ancient Indian history. Maybe other historians would be able to make use of genetics, but I can’t think of any such historians. Maybe there are some historians who can make use of scientific data better generally or of genetic data in some places. But by and large I do not know of any historians that make use of genetic data generally and certainly in the context of India I don’t think anyone has used genetics.



Many historians also observed that it had already been established by historians and social anthropologists that the caste system was a social phenomenon, and they dismayed to see that this issue was now being re-visited by geneticists. My interviewees were also concerned that genetic ‘explanations’ were likely to receive more weight in the public imagination because of the perceived ‘objectivity’ of the natural sciences as opposed to humanities. Thus, despite the fact that they considered genetics to be in a service position, they were not comfortable with the potential that it had for ‘colonising’ history with what could be seen by the public (and therefore funders) as ‘superior’ methods.

The remaining one third of respondents argued that they could see how genetics could be useful for historians, provided geneticists had ‘proper’ methodology – by which they meant consulting historians at the stage of determining their research objectives and sampling. One respondent wished it was possible to organise forums for geneticists and historians to meet and discuss the possibility of using genetics in historical research. He was convinced that it was historians that should be initiating these types of studies by formulating questions themselves and then directing geneticists by telling them what exactly it was that they wanted to be checked with the help of DNA tests, rather than leaving it to geneticists to be setting up their aims on the basis of their ‘general knowledge’ of history. Here genetics is again perceived as a service discipline; however, it is argued that it does not properly enact its ‘place’ in the hierarchy of disciplines.

At the same time, even those who were more optimistic about using genetics in history were not sure about how soon it will become a common tool for historical research. The general feeling was that they needed to learn more about it to be able to assess its prospects for the future. Many of them felt that geneticists had to do more outreach work and disseminate their results in historical journals or at least in popular science magazines. If they were to be published only in scientific periodicals which had a narrow focus they could hardly be expected to be noticed by historians and social scientists.

One of the experts on Jewish history suggested that he would sometimes use genetic studies as a ‘teaching device’:

On the first day of my history class I bring the genetic question to their attention. On the very first day in the introductory lecture to kind of challenge them, to open up the discussion around what we can know and what we can’t know and how the stories that are passed on to us may or may not be corroborated.

At the same time, he was not ready to reference these studies in his own research on the grounds that being a ‘non-scientist’ he did not know how to evaluate them. Thus for him genetic research on the Jewish communities is a social phenomenon, a ‘study-object’ to be explored by historians and social scientists. Instead of using it as a new tool to solve already existing controversies in Jewish history, he sees it as a new topic for historians to ponder about. The respondent was ready to acknowledge that interesting findings could come up from a collaboration between geneticists and historians, but this kind of interdisciplinarity, ideal in principle, would be very hard to achieve: ‘if historians are expected to study genetics and geneticists are expected to study history, well this is too much to ask. Specialisation is the future of the academy and a future of our modern world. And so I don’t know how that would look’. This attitude mirrors the responses of the interviewed geneticists, who quoted ‘structural’ pressures, such as the peer-review system and requirements of research output assessments, as factors preventing them from collaborating with historians more closely and presenting the results of their studies in history journals.

‘Structural’ pressures aside, almost every respondent appeared to be reluctant to engage with genetics because of its cultural image. Just like geneticists were concerned about being associated with a discipline occupying a lower level in the cognitive hierarchy, historians sought to avoid being ‘tainted’ by a discipline whose history was associated with eugenics. For instance, one respondent, who worked in the field of ancient Indian history, expressed concern about the extent to which genetic studies of human migrations were ‘scientifically correct’. Thus, he seemed to have doubts even about the science with a small ‘s’ involved in these types of studies. He wanted to see other scientists confirming the validity of these findings, as population genetics was a relatively new field. He would not mind using science in his work, but wanted to make sure that it was *bona fide* science. Interestingly, in this respect he went on to draw parallels between population genetics and eugenics:

In a sense, we have been here before with phrenology and craniometry. It all looked like scientific research at the time, but then it turned out that it was just a racist myth. How are we supposed to know if this study has any scientific value to it?

Like scientists themselves, this respondent is eager to engage in boundary-work (Gieryn 1999) and to demarcate ‘superior’ explanations of ‘proper’ sciences from ‘meaningless’ explanations of ‘pseudo’ sciences. It is just that for him population genetics does not completely count as a ‘proper’ science because of its historical baggage and

association with eugenics. He felt that this type of research was somehow too controversial to be valid and he expressed his reservations about it by suggesting that it had got to be faulty by the standards of other sciences.

All respondents, irrespective of what they thought about the explanatory power of science in general or about using genetics in historical research, stressed that no matter whether the geneticists got their science and historical references right or wrong, this kind of research was very controversial by virtue of the fact that it could have negative social and political implications. Practically everybody observed that it was unnecessarily naturalising such categories as castes and Jewishness and was likely to weaken claims of origin of at least some of the groups concerned. In this respect several respondents based in India called on the example of the tragic controversy around the Babri Masjid when some archaeologists were volunteering to 'prove' that the mosque was or was not built on the site of the temple that allegedly commemorated the birthplace of Rama.<sup>3</sup> According to them, even if it were somehow possible to establish what was originally built on this site, this information would be completely irrelevant for the discussion of who should worship here now, and any conclusion to such a study could be used to disempower either the Hindu or the Muslim groups. Many interviewees working in the field of Indian history noted that though the scientists who conducted genetic studies on caste most probably did not have any vested interest in arriving at a particular conclusion in their work and participated in their research out of 'pure academic interest', this 're-naturalisation' of caste represented a throwback to colonial discussions of the relationship between caste and 'race'.

A respondent from Jewish Studies noted that though he found genetic research on the Jewish communities interesting, he thought that it did bring up questions which were normally associated with Nazism and white supremacy, and that this research was going against everything he had learnt and taught about Jewish identity. In this case, like in the other responses of historians, the relationship between genetics and history is construed not just as hierarchical (with genetics being supposed to serve history), but also as antagonistic (mode 3 of interdisciplinarity in Barry et al's terms) in the sense that my interviewees were determined to challenge the epistemic assumptions of population genetic research. Interestingly, his

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<sup>3</sup> The Babri Masjid (the mosque of Babur, Urdu) was constructed in Ayodhya in the sixteenth century at the site which many Hindus believe was the birthplace of Rama, one of the incarnations of the god Vishnu. The mosque was destroyed in 6 December 1992 by the crowd brought in by the Hindu communalist party Vishva Hindu Parishad (World Hindu Council) and associated groups. The destruction of Babri Masjid sparked one of the worst outbreaks of sectarian violence in contemporary Indian history.

words echoed those of one of the geneticists quoted above, who was perplexed about some people wanting their Jewishness to be genetically tested. However, the historian argued that the impossibility of reducing Jewishness to genetics rendered genetic research aimed at searching for markers associated with Jewish populations meaningless. The geneticist, at the same time, was convinced that this was bona fide science. For the former, it was a failure of Science with a capital 'S'. For the latter, there was no contradiction between not being able to reduce Jewishness to genetics and still continuing to sample populations by their affiliation to Jewish tradition.

On the whole, the interviewed historians did not appear to be very comfortable dealing with 'scientific interventions' in their field. Contrary to the suggestions of geneticists, it was very difficult for them to view DNA-testing as yet another tool for historical research, which they should 'take on board' and use. Even those who did entertain the idea of using genetics in historical research, provided it was done in collaboration with historians, had reservations about using it because of its perceived association with eugenics and discriminatory anthropometric practices of the past. As was shown above, this even led one of them to question the very epistemological authority of this research.

In this respect, historians' responses to studies in population genetics could be viewed as an interesting case of public engagement with science and an example of 'non-scientists' renegotiating the boundaries between 'good' and 'bad' science. As it has been demonstrated by STS scholars, the credibility of science is validated by public trust. Once this trust is lost, science's explanatory power is also undermined in the eye of the public (Wynne 1995). It is also interesting to consider their responses in the light of studies which explored the social constructions of 'ignorance'. Peter Dickens has argued that public 'ignorance' of science may reflect an active moral stance countering what is seen as an irresponsible culture of scientism (2004). Mike Michael has demonstrated that when publics find available knowledge useless or socially dangerous they may refuse to assimilate it (1996). Interviewed historians felt very strongly that they did not need to know the science behind genetic studies to discard them on the basis of their own expertise and moral judgment. Their reactions may be seen as an example of what Brian Wynne has described as ignorance, which is 'not a cognitive vacuum, or a deficit by default of knowledge, but an active construct, and one with cognitive content, about the social dimensions of science' (Wynne 1995, 380).

## **Conclusion**

The geneticist David Goldstein reflecting on his work on the Jewish communities wrote that ‘genetics is slowly earning a place in the historical sciences’ and that ‘our narratives describing the histories of peoples and events ... are all being augmented and refined by genetic analyses in a field now often called genetic history (2008: 3). ‘Genetic history’ may indeed be gaining weight as a new field in its own right, but ironically its impact on the existing discipline of history so far seems to be rather modest. Studies which were meant to employ expertise from different disciplines, instead of becoming interdisciplinary, are evolving into a new field. Interestingly, this evolution is happening despite the aspirations of geneticists to portray their research as ‘genetics and nothing else’. The new field could be described as transdisciplinary (Barry et al 2008), but only in a rather negative sense. It is neither welcome on the territory of the ‘more respectable’ genetics, nor is it accepted by historians.

What appears to have prevented ‘genetic history’ from achieving more positive interdisciplinarity is the perceived and structural constraints that geneticists and historians feel they are under, and the way they view each other’s fields. For the purposes of fund-raising and publicity geneticists are happy to stress the interdisciplinary nature of their work. They frame their research questions in line with significant historical debates and interpret their results in a way that would make them look like solutions to historical mysteries. However, on the level of everyday research they are keen on keeping some distance from the discipline of history in the name of maintaining objectivity. On the whole, ‘doing history’ is explicitly or implicitly construed by them as a ‘step down’ from ‘proper’ scientific work. Though, as the example of one of my informants demonstrates, obtaining funding for engaging in a formal and meaningful collaboration with historians is not outside of the realm of possibility, most of my respondents shied away from it. Instead, they are anxious to gain recognition from fellow geneticists whose research may be very different from theirs, rather than from historians working on similar issues. As a result, they manage to maintain their reputation of ‘good scientists’ and publish their findings, despite the fact that in the view of historians their studies completely fail to answer the very research questions that they set for themselves.

Similarly, historians feel reluctant to refer to ‘DNA evidence’ in their work, because it is not a common practice in their discipline. They are also wary of genetic research, because of its perceived place in the hierarchy of disciplines. They view these studies as an attempt by scientists to push out the frontiers of their cultural authority into spaces already claimed by others (for relevance to theory of boundary-work see Gieryn 1995, 429). By pointing to lapses in the geneticists’ knowledge of relevant theories and findings from history and other social

sciences and humanities disciplines, they are renegotiating the boundaries between ‘good’ and ‘bad’ science and reinstating themselves as experts in the field in question.

Historians’ perceptions of the epistemological validity of this research also seem to be intertwined with their attitudes towards its possible social outcomes. Both geneticists and historians appear to be aware of the ethical implications of this kind of research. However, while scientists tend to dissociate their work from its political context, historians insist on playing the part of ‘responsible citizens’ and cast doubt on the validity of this research because of its social implications.

These predispositions towards or against taking into consideration the social context of research may be seen as what Bourdieu has described as ‘disciplinary habitus’ (2004, 42), or a package of socio-cultural norms that becomes to be associated with a particular discipline. Together with an orientation towards monodisciplinary peer-review and the perceived place of genetics and history in the hierarchy of disciplines, this prevents geneticists and historians from engaging with each other’s work in a more fruitful way.

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